

CLAIMS:

1. A method in a transmitter having an output comprising:

determining a current total transmit power for the
output;

5 determining a set of digital gains in response to the
current total transmit power;

applying the set of digital gains to a corresponding
set of code channels, the set of digital gains setting relative
powers of the set of code channels and also compensating for
10 non-linearities in the transmitter as a function of the current
total transmit power such that a desired relationship between
channel powers of said set of channels after having been
combined to produce the output is substantially achieved;

combining the set of channels to produce the output.

15 2. A method according to claim 1 wherein the desired
relationship between channel powers comprises a specified
relative power for each of the channels in the output.

3. A method according to claim 1 further comprising for
each of at least one channel:

20 maintaining a respective pre-set digital gain value
for the channel for each of a plurality of states of the set of
channels, and as a function of total transmit power;

wherein the digital gain to be applied to the channel
as part of said set of digital gains comprises the pre-set
25 digital gain for the current state of the set of channels, and
for the current total transmit power.

4. A method according to claim 3 wherein for each of said at least one channel, a respective pre-set digital gain is maintained for each of the plurality of states of the set of channels and for a plurality of ranges of total transmit power.

5 5. A method according to claim 4 further comprising for each code channel:

maintaining a respective pre-set digital gain value for the code channel for each of a plurality of states of the set of code channels, and for each of a plurality of ranges of
10 total transmit power;

wherein the digital gain to be applied to the code channel as part of said set of digital gains comprises the pre-set digital gain for a current state of the set of code channels, and for the range containing the current total
15 transmit power.

6. A method according to claim 3 wherein each state comprises a selection of a particular set of code channels from a set of possible code channels, and a selection of at least one of an encoding format, a signal format, and a data rate for at
20 least one of the set of particular code channels.

7. A method according to claim 3 wherein each state comprises at least one of:

a selection of a particular set of code channels from an available set;

25 a selection of a particular encoder format for at least one code channel;

a selection of a particular signal format for at least one code channel; and

a selection of a particular data rate for at least one code channel.

5 8. A method according to claim 4 comprising:

for each state and for each code channel:

maintaining the pre-set digital gains in a table mapping each range of transmit power to a respective pre-set digital gain.

10 9. A method according to claim 1 wherein, for each of at least one of the code channels determining a digital gain of said set of digital gains comprises:

determining a nominal digital gain for the code channel;

15 determining a gain adjustment for the code channel in response to the current total transmit power;

combining the nominal digital gain and the gain adjustment to produce the digital gain of said set of digital gains for the code channel.

20 10. A method according to claim 9 wherein the gain adjustment is a multiplicative gain adjustment and wherein combining the nominal digital gain and the gain adjustment to produce the respective digital gains comprises multiplying the nominal digital gain by the gain adjustment.

25 11. A method according to claim 9 wherein the gain adjustment is an additive gain adjustment and wherein combining

the nominal digital gain and the gain adjustment to produce the respective digital gains comprises adding the nominal digital gain to the gain adjustment.

12. A method according to claim 9 comprising:

5 for each state and for each code channel:

maintaining the gain adjustments in a table mapping each range of transmit power to a respective gain adjustment.

13. A method according to claim 12 wherein each gain adjustment is pre-determined to provide compensation over a
10 range of nominal digital gains.

14. A method according to claim 2 wherein the code channels are CDMA code channels.

15. A transmitter having an output and a current transmit power, the transmitter comprising:

15 a plurality of code channel generators and/or code channel encoders;

for each code channel generator and/or code channel encoder, a respective digital gain element;

a compensation element adapted to apply a set of
20 digital gains to the digital gain elements, the set of digital gains compensating for non-linearities in the transmitter as a function of the current total transmit power such that a desired relationship between code channel powers of said set of code channels after having been combined to produce the output is
25 substantially achieved.

16. A transmitter according to claim 15 wherein the compensation element comprises:

a memory containing for at least one code channel, a respective pre-set digital gain value for the code channel for each of a plurality of states of the set of code channels, and for a plurality of ranges of total transmit power.

17. A transmitter according to claim 15 wherein the compensation element comprises a controller adapted to configure the transmitter to have a selected state of a plurality of states, each state comprising at least one of:

a) a selection of a particular set of code channels from a set of available code channels;

b) a selection of a particular encoder format for at least one code channel;

c) a selection of a particular signal format for at least one code channel; and

d) a selection of a particular data rate for at least one code channel;

a memory containing for each state, a pre-set digital gain value for each code channel for each of a plurality of ranges of transmit power;

wherein for each code channel the controller is adapted to apply the appropriate pre-set digital gain value as a function of the state and total transmit power as one digital gain of said set of digital gains.

18. A transmitter according to claim 15 wherein the compensation element is further adapted to determine for at least one code channel a nominal digital gain for the code channel, and to combine a respective gain adjustment with each nominal digital gain value to determine the digital gains to be applied to the digital gain elements for the at least one code channel.

19. A transmitter according to claim 18 wherein the compensation element comprises a controller adapted to configure the transmitter to have a selected state of a plurality of states, each state comprising at least one of:

a) a selection of a particular set of code channels from a set of available code channels;

b) a selection of a particular encoder format for at least one code channel;

c) a selection of a particular signal format for at least one code channel; and

d) a selection of a particular data rate for at least one code channel;

a memory containing for each state, the pre-set digital gain adjustment for each code channel for each of a plurality of ranges of transmit power;

wherein for each code channel the controller is adapted to employ an appropriate pre-set digital gain adjustment as a function of the state and total transmit power as said respective gain adjustment.

20. A transmitter according to claim 15 further comprising:

a power control subsystem adapted to determine the total transmit power.

5 21. A computer readable medium comprising computer readable instructions for implementing a method comprising:

determining a current total transmit power for an output;

10 determining a set of digital gains in response to the current total transmit power, the set of digital gains setting relative powers of a set of code channels and also compensating for non-linearities in a transmitter as a function of the current total transmit power such that a desired relationship between channel powers of said set of channels after having been
15 combined to produce the output is substantially achieved.

22. A computer readable medium according to claim 21 wherein the method further comprises for each of at least one channel:

20 maintaining a respective pre-set digital gain value for the channel for each of a plurality of states of the set of channels, and as a function of total transmit power;

wherein the digital gain to be applied to the channel as part of said set of digital gains comprises the pre-set digital gain for the current state of the set of channels, and
25 for the current total transmit power.

23. A computer readable medium according to claim 22 wherein each state comprises a selection of a particular set of

code channels from a set of possible code channels, and a selection of at least one of an encoding format, a signal format, and a data rate for at least one of the set of particular code channels.

- 5 24. A computer readable medium according to claim 23 wherein, for each of at least one of the code channels determining a digital gain of said set of digital gains comprises:

 determining a nominal digital gain for the code
10 channel;

 determining a gain adjustment for the code channel in response to the current total transmit power;

 combining the nominal digital gain and the gain
adjustment to produce the digital gain of said set of digital
15 gains for the code channel.